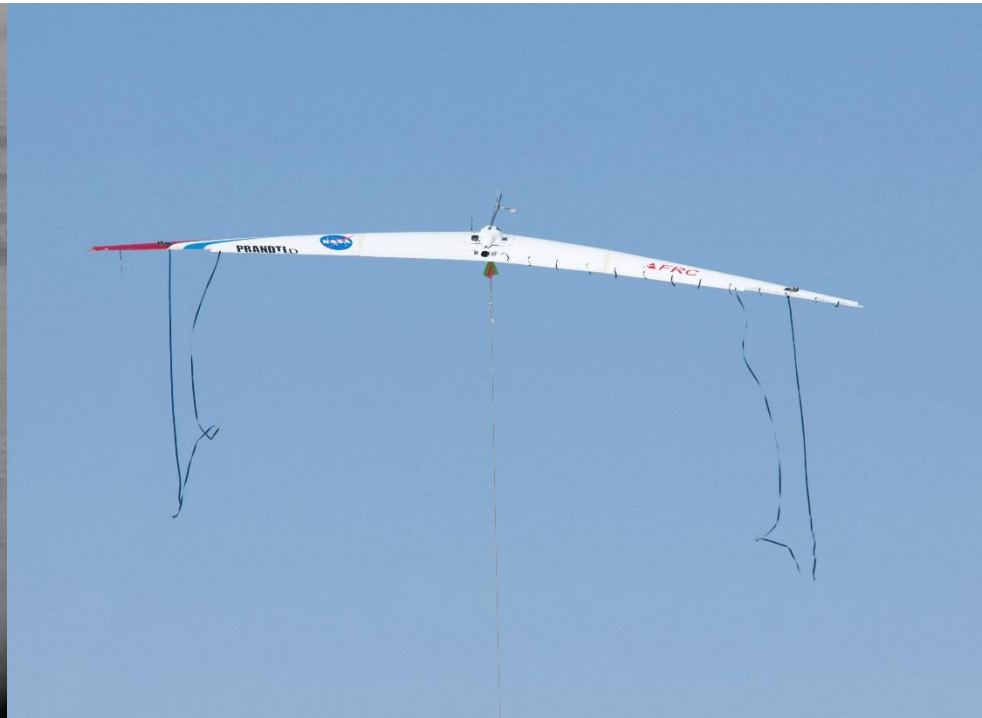
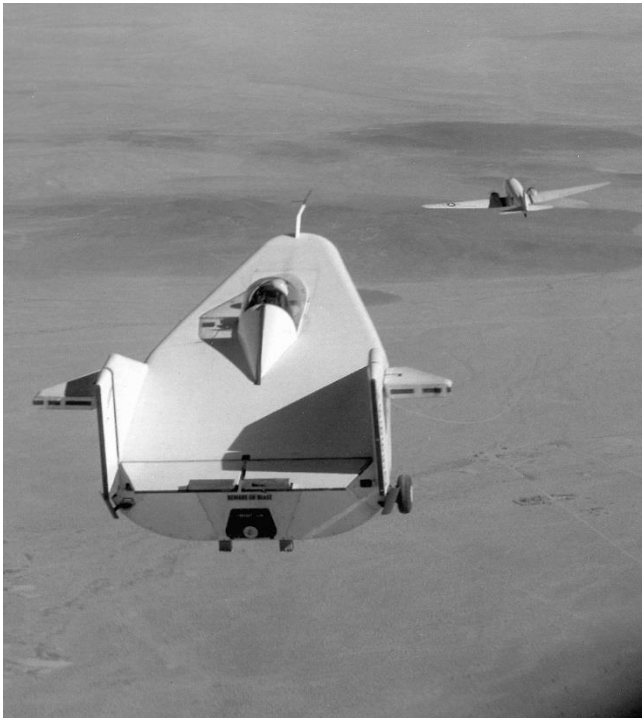


Dale Reed Subscale Flight Research Lab

(Ballin' on a budget)



- Historically, the Model Shop been used as an incubator to allow for the rapid prototyping, development, and testing of unique aerodynamic configurations ranging from low-speed testing of advanced hypersonic shapes to simple, proof-of-concept hand-launched gliders.
- Instrumentation used to characterize the performance of these vehicles can range from simple video documentation, to sophisticated real-time miniature data acquisition and telemetry downlink systems.
- Flights have also been conducted for test technique development of data systems or sensors.
- Operational concepts have varied from controlling the vehicles using conventional R/C systems flown from the ground with visual feedback to conducting missions from within a ground control station using a traditional stick and rudder ground based cockpit with the control signals being telemetered up to/down from the research vehicle. More recently sophisticated autonomous control algorithms designed to prevent the unintended flight of a vehicle into terrain have been tested efficiently using these types of test systems and operations.



- Design, fabrication, assembly, integration, checkout, modification, maintenance, and operation of experimental subscale flight research vehicles;
- Design and specification of COTS and research R/C control and flight management systems that support subscale flight research;
- Procurement of necessary components and systems to support subscale research flight;
- Subscale aircraft test piloting, training, and safety pilot services;
- Design, identification, integration, and operational use of sUAS airspace ranges;
- Center and projects risk management and airworthiness approval process;
- Center safety requirements, including ground safety, flight safety, and range safety requirements;
- Host support for Center reimbursable sUAS flight projects;
- Direct interface with a variety of center codes and offices;
- Center outreach to the public both on-campus and in the greater community



Red Jensen

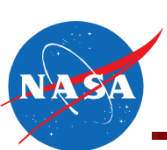
- Cat I & II sUAS Chief Pilot
- 25,000+ hours UAS
- Lifelong modeler



Derek Abramson

- sUAS Pilot
- BSEE Cal State Long Beach 2013
- 20 years Aerospace experience
- Lifelong modeler





Staffing



Justin Hall

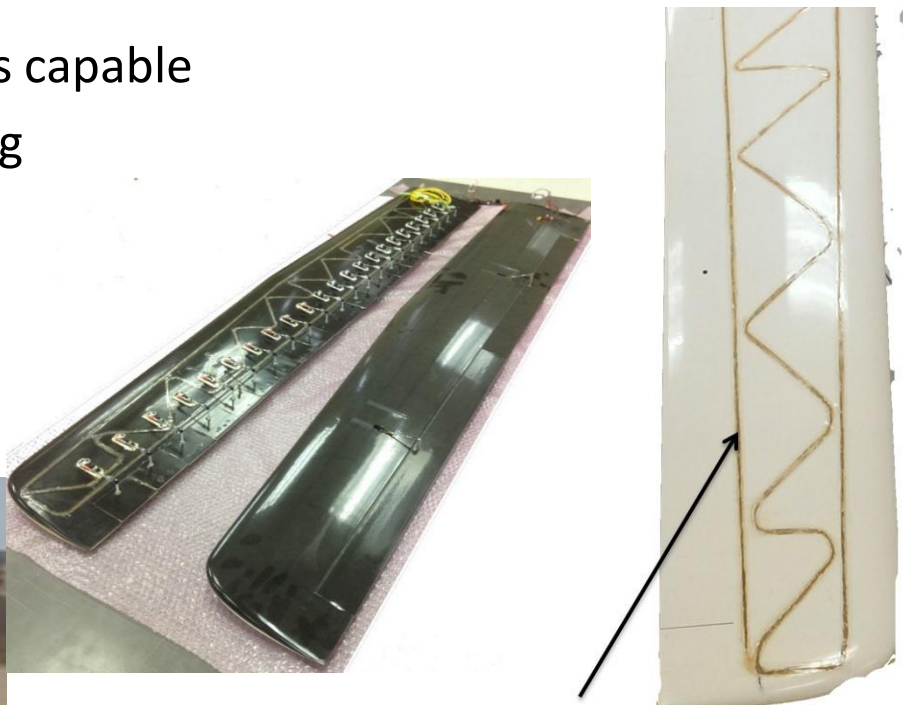
- sUAS Pilot
- Longtime modeler



- APV/FOSS
- X-56
- SPIDER
- DROID3
- TOAD
- PTERA
- Hugh
- PRANDTL series



- APV-3 vehicle (COTS) – Autonomous capable
- Armstrong Fiber Optic Strain Sensing
- Summer interns 2013, 14





- Engineering
- Integration
- Ground support



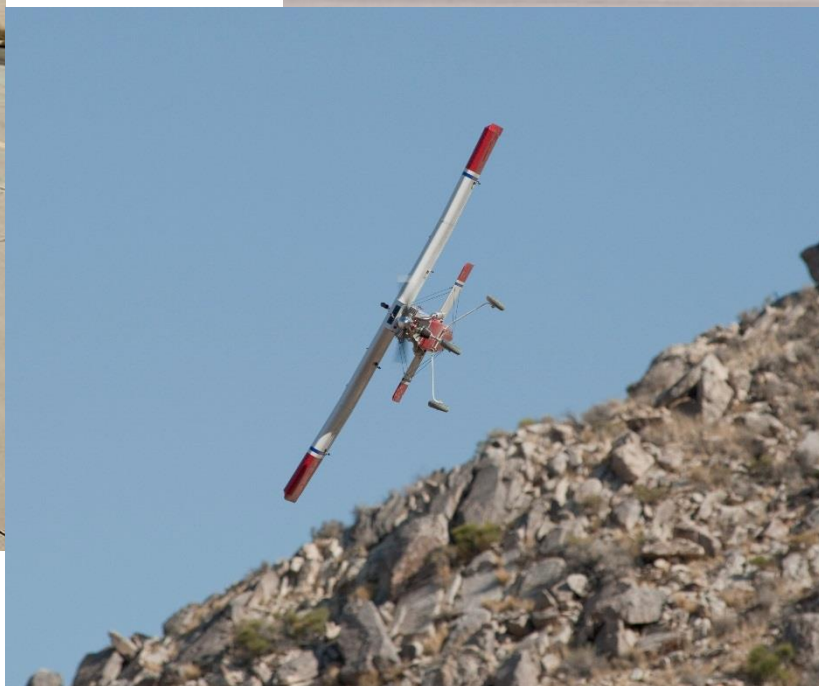
Specialized Photographic Imaging Drone with Eight Rotors

- DJI S1000 COTS system
- Pilot & gimbal operator crew
- Manual control only, GPS augmented
- Aerial photography



Dryden Remotely Operated Integrated Drone

- Fully autonomous
- 85+ lb. GTOW – 120 kts.
- ADS-b
- DGPS
- Configured as tow plane for TOAD project



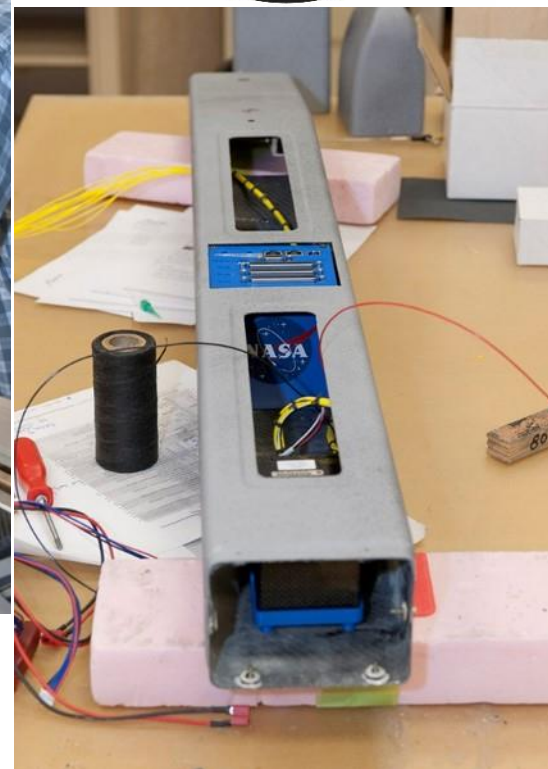
Towed Orbital Asset Delivery

- Towed air launch LEO platform
- 100+ lb payload capability



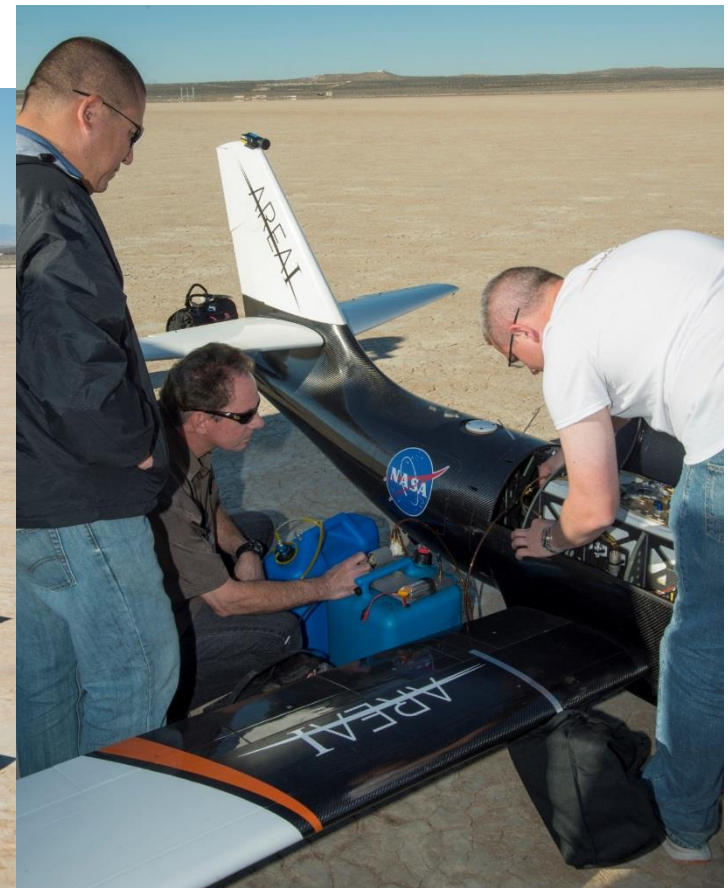
Towed Orbital Asset Delivery

- Aero design and composite fabrication



Prototype Technology Experimental Research Aircraft

- Twin turbine multi task test bed
- Fully autonomous
- 200 lb. GTOW 140kts.
- 80 + lb. payload



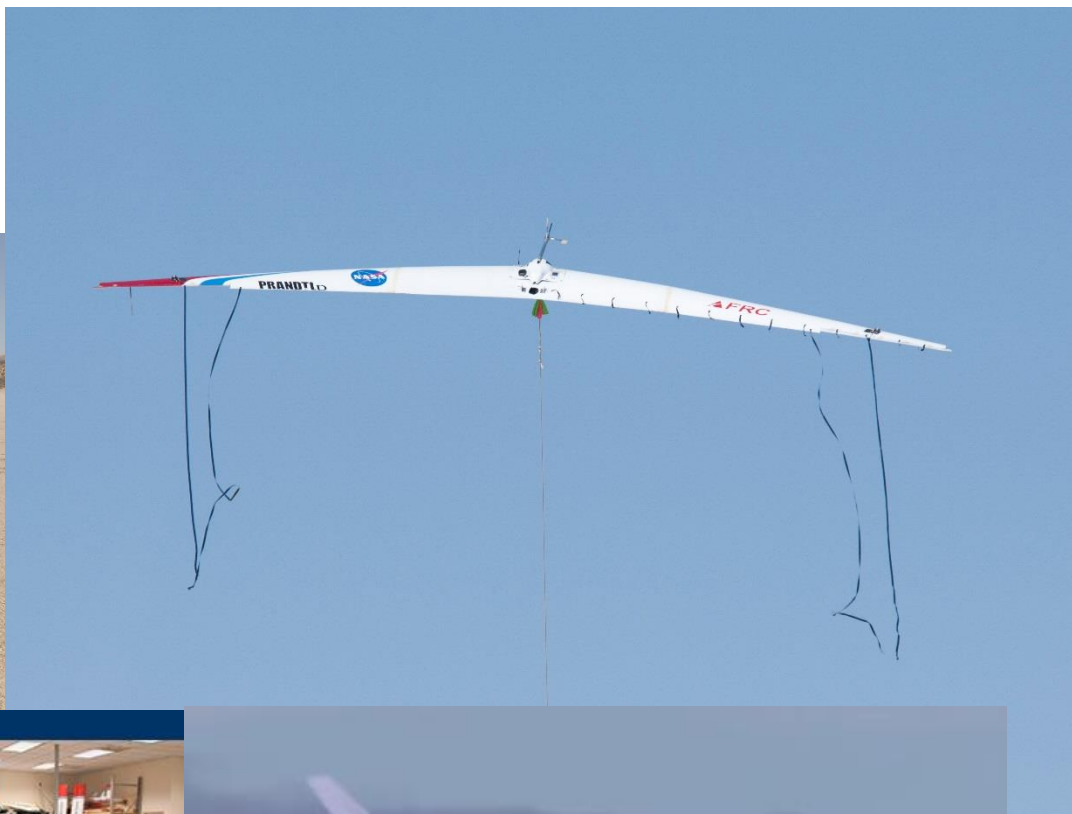
Open source autopilot test bed

- COTS electric R/C airframe
- University of Minnesota Flight Computer



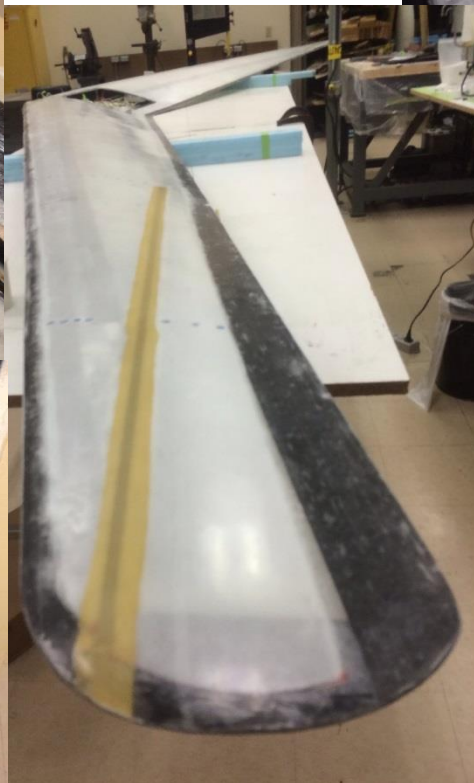
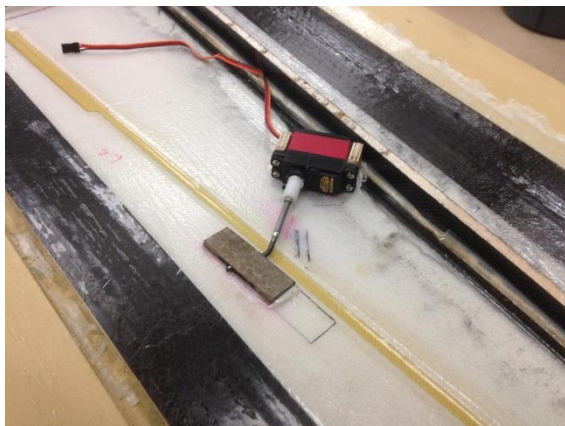
Prototype Research AerodyNamic Design To Lower drag

- Alternate span load demonstration vehicles
- 4 Vehicles
 - *P-1 & 2 12.5' span*
 - *P-3 25' span*
 - *P-m 24" span*



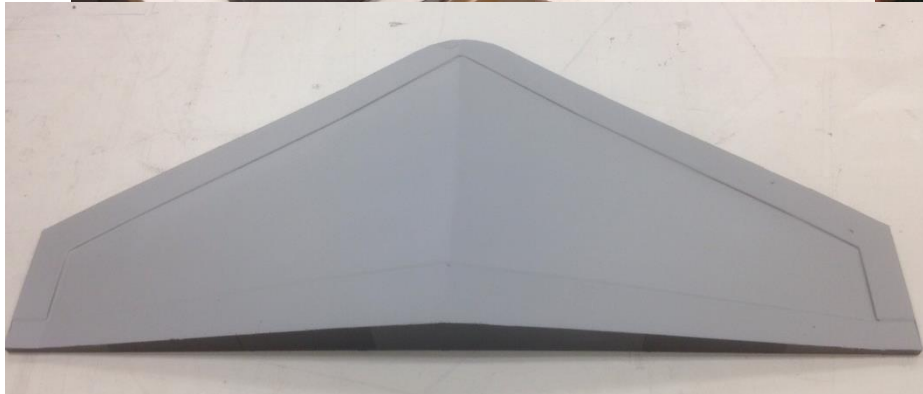
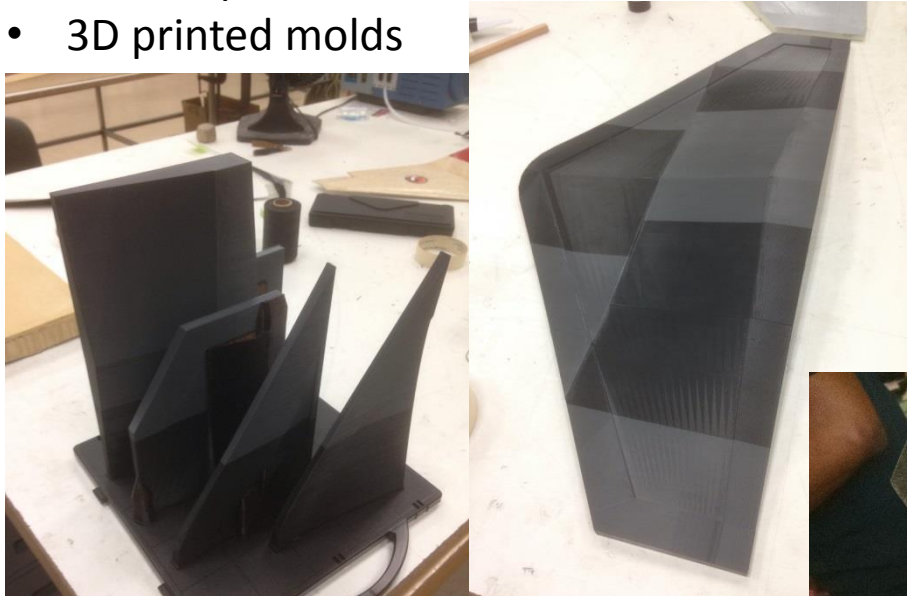
Prototype Research AerodyNamic Design To Lower drag

- P-3
- 25' span
- 55 lbs. gross
- All hollow molded construction



Prototype Research AerodyNamic Design To Lower drag

- P-m
- Mars exploration vehicle
- 3D printed molds



Prototype Research AerodyNamic Design To Lower drag

